Original Article

Pattern of toxicology cases in Emergency, Tribhuvan University Teaching Hospital

Raut S, Shakya YL, Maharjan RK, Shrestha TM, Neupane RP

Department of General Practice and Emergency Medicine, Maharajgunj Medical Campus, Institute of Medicine, Nepal

Corresponding Author: Dr.Shankar Raut

Email: drshankarraut@gmail.com

Abstract

Background: Acute poisoning is one of the major contributors of heath problem causing morbidity and mortality in the emergency of the hospital. The study focused on the demographic and epidemiological aspects of all the poisoning cases that came to Emergency of TUTH.

Methods: The study was a cross-sectional retrospective data collection of all poisoning cases recorded in hospital from April 2016 to March 2018. Hospital records of all poisoning cases were used to extract demographic and other data such as poisonous agents used, circumstance of poisoning, route and outcome of poisoning. The data analysis was done in Microsoft Excel.

Results: The total number of cases was 641 out of which 40 cases were excluded from the study. Of 601 cases, males were 42.09% and females were 57.90%. The most common age group for both male and female was 16-26 years group and male to female ratio was 1:1.3. The most common circumstance of poisoning was deliberate self-harm which was 91.68% followed by accidental which was 4.6%. The common route of administration was ingestion at 99.91%. The mortality in the Emergency was 5.15% and total of 75.04% cases were admitted in observation after primary management in ER and discharged from the observation after improvement and psychiatric evaluation. The most common toxicology agent was pesticide at 52.57%followed by pharmaceuticals at 25.45%.

Conclusions: Pesticides are the major cause of poisoning and accounts for majority of cases of toxicology followed by pharmaceuticals. The study also concludes that the young age group is more vulnerable to poisoning, hence strong regulatory measures are required for control of easy accessibility of these substances.

Keywords: Toxicology, Poisoning, TUTH.

Introduction

Poisoning is a major public heath problem around the world with and estimate of 108,000 deaths by unintentional poisonings in 2015[1] and approximately another million death by suicide[2]. Of all these deaths, 84% occurred in low and middle-income countries, the reason being poor supervision of chemical management system and health care delivery system[3].

Nepal is a developing country with agriculture contributing around 27.04 percent of GDP in 2017[4]. Since the country's major source of income is agriculture, this has also lead to easy accessibility to pesticides.

There is a worldwide information regarding acute poisoning, however there is a limited recent data regarding acute poisoning cases of Nepal. So there is a need for up-to-date appraisal of poisoning.

The study deals with the demographic factors like age, sex, common toxic agents, disposition and outcome of acute poisoning cases.

Methods

The study was cross sectional retrospective study done at Department of General Practice and Emergency Medicine, TUTH and obtained data from April 2016 to April 20118. All the poisoning cases that came to Emergency were included in the study. The registration number and personal details of patient was collected from emergency patient registration book and this information was used to trace patient's files. The rest of the information regarding the cases were collected from patient case files and analyzed.

All these data were entered in Microsoft Excel.

Ethical consideration

Approval to conduct research was obtained from Institutional Review Board. Permission was also obtained from the Department and hospital to access the hospital records of the patient. All records were kept confidential.

Results

Demographic distribution

A total of number of poisoning cases were 641 out of which 40 cases had incomplete or missing data and were excluded from the study, resulting in 601 cases being reviewed. The youngest patient was 10 years old and oldest was 85 years and the mean age was 30.36 years. 57.9% of cases were female population and 42.09% cases were male. The male to female ratio was 1:1.3.Poisoning was highest in the age group 16-26 years, which was 47.08%, followed by age group 26-36years which was 26.12%. It was lowestin the age group 76-86 years, which was 0.49%. The highest number of poisoning cases in female and male was in age group 16-26 years, which was 51.1% and 41.50% respectively. However there were only males in age group 76-86 which was 3(1.18%).

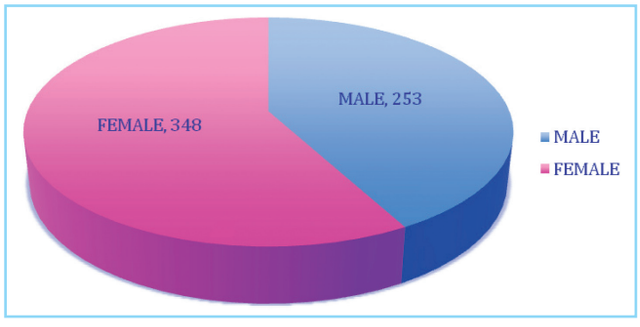

Fig 1. Sex of the cases.

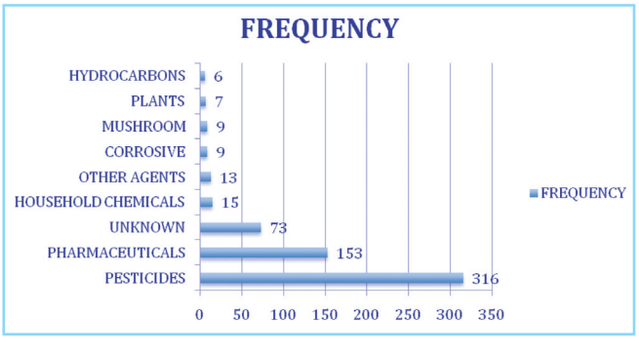

Fig 2:Toxicology agents used.

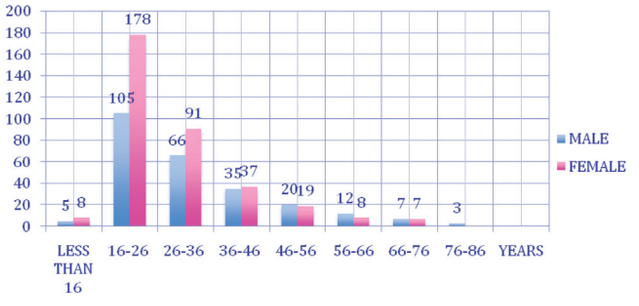

Fig 3. Age distribution of the cases

Circumstance of poisoning and route of poisoning

Of all the cases, 551(91.6%) cases were of deliberate self-harm. 28(4.6%) were accidental exposure and 22(3.6%) were cases of incidental exposure. The number of cases exposed to toxin by ingestion was 596(99.1%) and the remaining 5(0.83%) were exposed to toxin by inhalation.

Disposition

Of all the cases in Emergency, 451(75.04%) were admitted in observation and discharged after psychiatry consultation. The cases referred to ICU or for monitoring bed were 101(16.8%) of which 54(53.4%) were cases of organophosphate poisoning. The mortality in the emergency was 31(5.15%) and 14(2.32%)cases left against medical advice and 4(0.66%) patients were referred to pediatricemergency after primary care. Of all deaths 18(58.06%) cases were of organophosphate, 10(32.2%) were of aluminum phosphide, 2(6.45%) cases were of rodenticide and 1(3.22%)case was of pharmaceutical.

Toxic agents

Pesticides and pharmaceuticals were most commonly used agents for poisoning. Of 316pesticide poisoning cases, 210(66.45%) were organophosphates. Also out of 153 pharmaceuticals poisoning cases, 89(58.16%) were

cases of paracetamol ingestion. There were 73(12.14%) cases of poisoning where the agent name couldn't be found and were classified as unknown substance ingestion. Similarly rodenticide ingestion cases were 61(19.30%) out 316 cases of pesticides.

NAME OF POISON	FREQUENCY
PESTICIDES	
ORGANOPHOSPHATE	210
ROTENTICIDE	61
INSECTICIDE	14
CYPERMETHRIN	14
ALUMINIUM PHOSPHIDE	13
UREA	1
FUNGICIDE	1
BAYGON	1
HERBICIDE	1
PHARMACEUTICALS	
PARACETAMOL	89
MULTIPLE	20
BZD	9
ANTIEPILEPTICS	5
NSAIDS	6
ANTIDEPRESSANT	4
ANTIBIOTICS	3
ANTIHYPERTENSIVE	3
ANTIPSYCHOTIC	2
CALAMINE LOTION	2
ZINC	2
OPOIDS	1
ESTROGEN	1
IRON CAPSULE	1
STEROIDS	1
TYROXINE	1
ATROPINE	1
BETADINE	1
AMPHETAMINES	1
HOUSEHOLD CHEMICALS	
DISINFECTANT	13
CLEANING AGENTS	2
CORROSIVES	9
MUSHROOM	9
HYDROCARBONS	6
PLANTS	
DHATURA	3
HERB	2
ACONITE	1
NIRMASI (DELPHINIUM DENUDATUM)	1
OTHER AGENTS	
GAS GEYSER (TOXIC GAS)	4
LEAD	1
SACCHARINE	1
PAINT	1
MERCURY	1
NITROBENZENE	1
TURPENTINE OIL	1
CAMPHOR	1
METHANOL	1
ISOPROPYL	1
UNKNOWN	73
INCOMPLETE DATA	40
TOTAL	**641**

Discussion

In our study, out of 601 cases 57.9% cases were female and 42.09% case were male which was similar to study by Amarnath Mishra et al[9] in which females were 57.89%. The study by D.P Singh etal[5] andPaudyal BP[14] also concluded that poisoning was higher in female compared to male similar to our study.

The number of poisoning cases was more common in females in all the age groups except in76-86 age group, which had no female cases. Theratio of male: femalein our study was 1: 1.3which was similar to the study conducted by D.P Singh et al[5]which was also 1:1.3. The male to female ratio was also similar to other studies done by Lohani SP[11],which was 1:1.9 and GurungCKet al[8], which was 1:1.17. The study showed that female population was more vulnerable to poisoning.

The most common age group of poisoning in our study was from 16-26 years which was 47.08% followed by 26-36 years which was 26.12%. Similar to our study, the most common age group in study done by D.P Singh et al[5] was 16-25 years, Gurung CK et al[8] was 15-24 years,

Amarnath Mishra et al[9] was 16-30 years, and Paudyal BP[14] was 15-34 years. The study showed that the young age group was more vulnerable to poisoning.

In our study, the number of cases below 16 years was 2.16%,the reason being most of the pediatric patients directly went to the pediatric emergency.The number of cases of accidental exposure in our study was 4.6% compared to study byD.P. Singh et al[5] which was 2% and Jessy Z' gambo et al [10] which was 52%.Since the number of cases below 16 years was 2.16%, this might be one of the reasons for less number of accidental exposures to toxic substance in our study.

In our study, majority of cases were of pesticidesat 52.57% followed by pharmaceuticals at 25.45% which was similar to study by LohaniSP[11] in which the most common agents was agricultural agents at 55.5% followed by drugs at 25.9%. The study by Jerry Z' Gambo et al[10] also concluded that pesticide were thethe most common agent at 57% followed by pharmaceuticals at 13%. Similarly the studies by D.P. Singh et al[5] ,Karki RK et al[12] and BhimShova Tuladhar[13] also found that insecticides were the most common toxicology agent used for poisoning. The easyaccessibility could be the reason for pesticides being the preferred agent of poisoning.

In our study, organophosphate was the most common agent in pesticide group at 66.45% which was similar to study by Dr.SM Kar MD et al[6] in which 66.13 % were cases of organophosphate. Similar to our study, the study by BhumiShovaTuladhar and Jerry Z' Gamboetal[10] also had organophosphate as the most common pesticide at 71% and 51.9% respectively. Paracetamolwas the most common agent in pharmaceutical group, which was similar to the studies by D.P. Singh et al[5] and Paudyal BP[14].

In our study, the toxic agent couldn't be determined in 12.1% and these patients were kept under the diagnosis of unknown poisoning[10] while in the study by Jessy Z' Gambo et al[10], 19.8% of cases were kept under the category of unspecified agents.

In our study, the mortality in the emergency was 5.15% which was higher compared to studies by D.P. Singh et al[5]which was 3% and Jessy Z' Gambo et al[10]which was 2.6%. Out of 601 cases, 451(75.04%) were admitted in observation and discharged after psychiatry consultation. The cases referred to ICU or for monitoring bed were 101(16.8%) out of which 54(53.4%) cases were of organophosphate poisoning. 12(5.97%) cases of organophosphate cases were admitted to our centre from the emergency for ICU/ Monitoring bed and managed. There was no mortality among organophosphate poisoning cases that got admitted in our center. However the study didn't include the outcome of the patients who were shifted to ICU or monitoring bed in other hospitals, as these patients couldn't be traced.

In our study,mortality was highest among the pesticide group, which was 96.77% of total mortality cases. The highest mortality rates in pesticides group was among aluminumphosphide cases at 76.92%, which was followed by organophosphate cases at 8.95%. The pattern of mortality was similar to the study by Lohani SP[11].

In our study, deliberate self-harm was the most common circumstance for poisoningwhich 91.6% which was contrary to study by Jessy Z' gamoet al[10] which showed accidental exposure was most common circumstance of poisoning at 58.5%. The reason for this could be because our emergency dealt with cases only above16 years. However study by D.P. Singh et al[5], Paudyal BP[14] and Karki RK et al[12]also concluded that most common circumstance of poisoning was intentional poisoning with suicidal attempt.

Limitation

The study used the secondary data that were collected from the patient's record files. At times there were lost and torn pages, certain information were either not recorded in the first place or got erased as the carbon copy was kept as the record. Many toxic agents were not specified and were kept under broad heading making it difficult to classify the agents. Similarly exact toxic agents couldn't be found out in good number of cases and were kept under heading of unknown poisoning. Follow up of those cases who were referred to ICUor for monitoring bed due to unavailability of beds in our center couldn't be done and the exact outcome of these patients couldn't be determined. Similarly the intent for poisoning, whether suicidal or non suicidal couldn't be determined in all the cases of deliberate self harmdue to lack of uniform recording andthe long-term complications of the toxicology cases couldn't be done, as there wasn't enough information for tracking these patients.

Conclusion

The study concluded that poisoning is still one of the major health problems in our part of world and young femalegroup are the vulnerable group. Since young age group constitute a major proportion of cases, health education on chemical safety and psychological support programs are essential for prevention of poisoning.

Pesticides and pharmaceuticals are the two leading cause of poisoning, which emphasis on the strict regulatory control for obtaining these substances.

A unique and uniform format for recording poisoning cases should be maintained throughout Nepal, different from the format for recording other cases, which would help in further researches.

Similarlyproper referral systems for cases of poisoning should be maintained so that patient can be tracked for outcomes and further studies.

Acknowledgements

We would like to express our appreciation to the Department of General Practice and Emergency, Tribhuvan University Teaching Hospital for encouragement and guidance during this research.

Conflict of interest: None declared.

Reference

1. World health statistics 2017 monitoring health for life SDG.
2. WHO International Programme on Chemical Safety https://www.who.int/ipcs/poisons/en/
3. WHO poison information prevention and management http://www.who.int/ipcs/poisons/en/
4. Nepal: Distribution of gross domestic product (GDP) across economic sectors from 2007 to 2017
5. D. P. Singh, R. P. Aacharya, Pattern of poisoning cases in Bir Hospital, Journal of the Institute of Medicine · January 2006 DOI: 10.3126/joim.v28i1.426
6. Dr. S. M. Kar, MD, Dr. SidarthaTimsinha, MBBS, Dr. PrashantAgrawal, Ph.D,An Epidemiological study of Organophosphorus Poisoning at Manipal Teaching Hospital, Pokhara, Nepal, J Indian Acad Forensic Med, 32(2)
7. Thapa SR[1], Lama P, Karki N, Khadka SB, Pattern of poisoning cases in Emergency Department of Kathmandu Medical College Teaching Hospital, Kathmandu Univ Med J (KUMJ). 2008 Apr-Jun;6(2):209-13.
8. Gurung CK[1], Dahal R, Khanal P, Nepal S, Jaiswal AK.Pattern of poisoning cases in a hospital in a Terai district of central Nepal.Nepal Med Coll J. 2011 Sep;13(3):160-3.
9. Amarnath Mishra[1*], Shukla SK[2], Yadav MK[3] and Gupta AK[1]. Epidemiological Study of MedicolegalOrganophosphorus Poisoning in Central Region of Nepal
10. JessyZ'gambo[1,2*], YorumSiulapwa[2] and Charles Michelo[1] Pattern of acute poisoning at two urban referral hospitals in Lusaka, Zambia.BMC Emergency Medicine (2016) 16:2 DOI 10.1186/s12873-016-0068-3
11. Lohani SP, *Nepal Drug and Poison Information Center, Shamakhushi, Kathmandu* . An Epidemiological Study of Poisoning Cases Reported to the Nepal Drug and Poison Information Center, Kathmandu
12. Karki RK,[1] Risal A[2] Study of Poisoning Cases in a Tertiary Care Hospital Kathmandu University Medical Journal · September 2014 DOI: 10.3126/kumj.v10i4.10999 · Source: PubMed
13. BhinuShovaTuladhar, Trends of Clinical Toxicology Cases in Nepal *National Forensic Science Laboratory, Kathmandu, Nepal* Tuladhar, J Forensic Res 2014, 5:2 DOI: 10.4172/2157-7145.1000217
14. Paudyal BP, JNMA J Nepal Med assoc. Poisoning : pattern and profile of admitted cases in a hospital in central Nepal 2005 Jul-Sep;44(159):92-6.